



Field sampling activities use new ISO-CART™ system

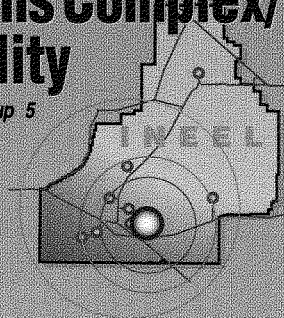
Demolition activities at WERF incinerator



Workers remove ARA-16 piping as part of the remediation activity

# Waste Reduction Operations Complex/ Power Burst Facility

FFA/CO Designation: Waste Area Group 5



**Established:** Late 1950s

**Original Mission:** Originally known as the Power Burst Facility/Auxiliary Reactor Area; conducted research in reactors and reactor safety; treated DOE's solid mixed low-level waste

**Current Mission:** Storing spent nuclear fuel, and mixed low-level and low-level waste

## Cleanup Well Under Way

Cleanup is well underway at the sites identified in the 2000 comprehensive investigation Record of Decision for the Power Burst Facility/Auxiliary Reactor Area. Workers completed remediation of the ARA-16 radionuclide tank site. They excavated the ARA-16 piping, prepared to ship sludge off site for treatment and disposal, and completed demolition of the ARA-25 hot cell. The rubble was broken into small pieces and shipped to the Radioactive Waste Management Complex for disposal.

## Risk Reduced, Time and Money Saved

To decontaminate the ARA-16 tank and piping before they were excavated, INEEL scientists designed a specialized nozzle that could be attached to a high-pressure commercial sprayer. The modified sprayer produced 50 percent less wastewater — reducing both wastewater disposal costs and the risk to workers. It also saved \$783,000 in off-site decontamination costs.

Workers also used another new technology during the cleanup

process — the ORTEC® ISO-CART™ system. The system is used to conduct field analysis of samples of materials contaminated with gamma-emitting radionuclides. The new system takes just minutes instead of the weeks necessary for analysis at a laboratory. Because nearly 100 sites required sampling, it also saved money and reduced handling and transportation risks.

## INEEL and Russian Scientists Work Together

Scientists from the INEEL and Russia combined technologies to assess two contaminated areas. The INEEL's ATRV-Jr™ carried two Russian-developed sensing technologies: a gamma locating device and an isotopic identification device. The combined technologies may improve the efficiency of D&D&D projects, reduce costs and improve safety.

## 5-Year Review Completed

The INEEL conducted an annual inspection of the Stationary Low Power-1 and Boiling Water Reactor Experiment-I burial grounds to make sure its remedial actions continue to be effective. No

deficiencies were identified. The INEEL met a milestone that required a 5-year review summary report on the sites one month early.

## Incinerator Closure Begins

The INEEL began the closure process for the Waste Experimental Reduction Facility (WERF) in 2001. It is expected to take three years. The facility treated low-level waste from 1985 to June 2000.

### FY 2001 Highlights

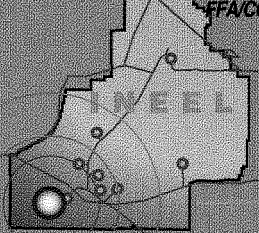
- Continued remedial actions at seven sites; completed two (FFA/CO)
- Treated 1,353 cubic meters of low-level waste, exceeded milestone by 153 cubic meters (Site Treatment Plan)
- Met all treatment and disposal goals for mixed low-level waste (Site Treatment Plan)
- Continue characterization of tanks and components; completed actions on 13 of 44 items (VCO)

### FY 2002 Goals

- Continue PBF-620 canal water evaporation
- Begin/complete D&D&D at PBF-620
- Begin shipping spent nuclear fuel to interim dry storage at Idaho Nuclear Technology and Engineering Center (complete by December 2003)
- Continue characterization of tanks and components (VCO)
- Begin planning WERF closure

# Radioactive Waste Management Complex

FFA/CO Designation: Waste Area Group 7



**Established:** Late 1952

**Original Mission:** Disposed of solid, low-level radioactive waste; buried transuranic waste and hazardous substances (e.g., organic and inorganic chemicals) until 1970; stored transuranic waste on aboveground pad and disposed of other waste in 20 pits, 58 trenches and 21 soil vault rows from 1970 to present

**Current Mission:** Temporarily storing transuranic waste until it is shipped to the Waste Isolation Pilot Plant for permanent disposal

A TRUPACT-II is loaded for shipment to WIPP



## 3,100 m<sup>3</sup> Project on Track

The INEEL continues to characterize, certify and ship transuranic waste to the Waste Isolation Pilot Plant for permanent disposal to meet a 1995 Settlement Agreement milestone. By Dec. 31, 2002, 3,100 cubic meters (about 15,000 barrels) of transuranic waste must be removed from Idaho. In spite of significant challenges, the INEEL removed 687 cubic meters from Idaho during FY 2001, bringing the cumulative total to more than 1,800 cubic meters.

The INEEL was able to speed up shipments during the summer of 2001. The INEEL's workers began building a shippable inventory in March 2001, in anticipation that the state of New Mexico would approve new shipping requirements in May. As a result, the INEEL was able to increase its shipments to seven per week in June and to 10 per week in July. At the end of FY 2001, the INEEL still had 511 cubic meters of shippable waste in its inventory.

## New Technologies Support 3,100 m<sup>3</sup> Project

Scientists and researchers at the INEEL have developed new

technologies to allow more drums to be certified for shipment to the Waste Isolation Pilot Plant. One of these technologies is the Enhanced Real-Time Radiography System, which can measure the liquid or sludge levels in a 55- or 85-gallon waste drum while it is in a shielded enclosure.

Another new technology is the Heated Gas Generation Test System. The system heats and captures gases released from vented waste drums and analyzes the levels of potentially flammable gases.

## Pit 9 Dispute Resolved

In February 2001, the INEEL requested that the Pit 9 schedule be extended because of design complexities. When the state of Idaho and EPA denied the request, DOE sought formal dispute resolution.

The dispute was resolved April 16, 2002, with the signing of an Agreement to Resolve Disputes. The agreement sets new enforceable deadlines for both Pit 9 and the comprehensive remedial investigation and feasibility study for the Subsurface Disposal Area.

The agencies also agreed on a technical approach — the Glovebox

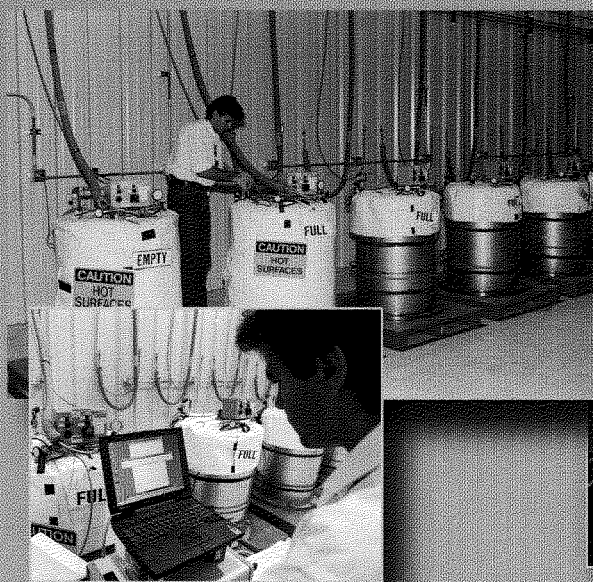
Excavator Method — for a retrieval demonstration at Pit 9. Workers will remotely excavate wastes and examine them in a shielded confinement structure, or “glovebox”. The glovebox operates under negative air pressure to prevent contamination from escaping. Then the waste will be treated so it can be shipped to the Waste Isolation Pilot Plant.

## State and DOE Resolving Buried Waste Issue

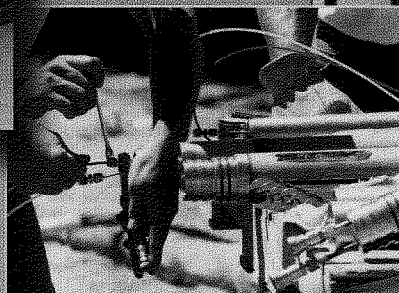
In April 2002, the governor of the state of Idaho asked a U.S. District Court to provide a declaratory ruling on different interpretations of the waste addressed in section B.1 of the 1995 Idaho Settlement Agreement. The Agreement requires DOE to treat and ship 65,000 cubic meters of transuranic waste out of Idaho by 2018 at the latest. There is no specific language requiring excavation of buried waste.

DOE believes the Agreement refers to 65,000 cubic meters of waste that was stored aboveground in 1995 and managed as transuranic waste. In contrast, the state of Idaho believes that both stored and buried

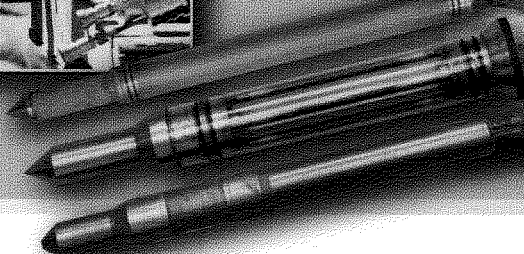
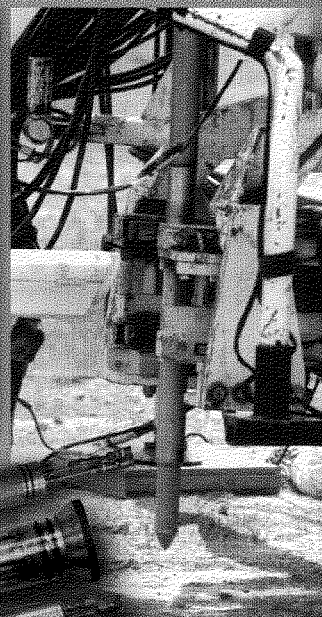




The Heated Gas Generation Test System helps DOE meet its transuranic waste shipment milestones



Probes are installed in the Subsurface Disposal Area



transuranic waste must be shipped off site.

The buried waste is being remediated under the Federal Facility Agreement and Consent Order with the state of Idaho and EPA as active partners. The Federal Facility Agreement and Consent Order uses the CERCLA process, which examines options to find the best solution for reducing risk to workers, the public and the environment.

The use of the CERCLA process to select a remedial action (whether excavation, some method of in-situ immobilization, or a combination) was reaffirmed by the state of Idaho in the April 2002 dispute resolution settlement.

## Comprehensive Investigation Continues

The INEEL continued preparing the comprehensive remedial investigation, baseline risk assessment and feasibility study for the Subsurface Disposal Area. The study identifies remediation options and analyzes the associated risks.

The Pit 9 dispute resolution established new enforceable deadlines: Aug. 31, 2005, as the final date for releasing the draft

remedial investigation and baseline risk assessment; Dec. 31, 2005, as the final date for issuance of a draft feasibility study; and Dec. 31, 2006, as the final date for a draft record of decision.

## Large-Scale Research Effort Under Way

In FY 2001, the INEEL continued to gather information about the composition and condition of the buried wastes at the Subsurface Disposal Area and the surrounding soils. Workers installed 98 Type A probes — capped pipes into which workers can lower nuclear logging instruments — to help characterize the waste. They also installed 165 Type B probes. These consisted of:

- 78 soil-moisture probes, which monitor moisture and temperature for potential contaminant releases
- 32 vadose zone tensiometers, which monitor subsurface soil tension
- 30 vapor-port probes, which are used to collect soil gas samples
- 18 lysimeter probes, which are used to collect one-liter water samples

## FY 2001 Highlights

- Shipped 1,160 cubic meters of transuranic waste to WIPP (1,282 cubic meters cumulative by the end of FY 2001) (Settlement Agreement)
- Disposed of 3,186 cubic meters of low-level waste
- Removed 100,000 lbs. (220,000 kg) of organic contamination in the vadose zone

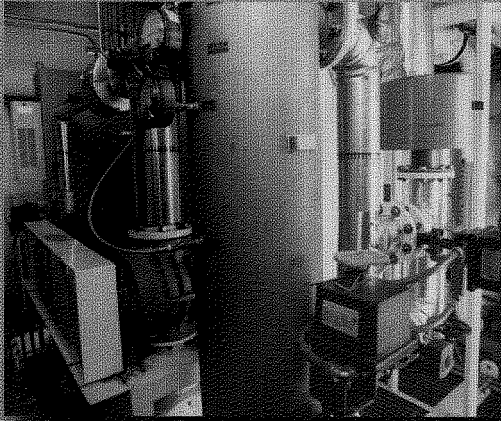
## FY 2002 Goals

- Continue cleanup of organic contamination in the vadose zone (FFA/CO)
- Complete shipment of 3,100 cubic meters of stored transuranic waste to the Waste Isolation Pilot Plant (Settlement Agreement)
- Continue construction of AMWTP (will begin operating in 2003) (Settlement Agreement)

- 7 visual probes, which allow scientists to view waste and soils.

The INEEL estimates that the probes will provide an \$8.5 million cost-savings during the next four years and improve worker safety by reducing the risks associated with taking core samples and handling core materials.

The INEEL is also using new portable technologies — a field-sampling glove bag and a real-time analysis system — to reduce risks and costs associated with time-



New catalytic oxidizer treats organic vapors extracted from the vadose zone

Advanced Mixed Waste Treatment Project construction is nearly complete



consuming laboratory analysis. These technologies will save nearly \$1 million.

### Organic Vapor Removal and Treatment Gets Boost

The INEEL used its vapor vacuum extraction system to remove and treat almost 100,000 pounds of volatile organic compounds from the vadose zone during FY 2001. Nearly 62,200 pounds of the volatile organic compounds were carbon tetrachloride.

The INEEL upgraded the vapor vacuum extraction system in FY 2001 with a catalytic oxidizer. The new oxidizer handles twice the flow rate and is more effective at destroying organic vapors. The upgrade will save \$43,500 annually, nearly \$652,000 over its 15-year life span.

The INEEL is saving another \$320,000 per month, almost \$40 million in the project's expected lifetime, by using the B&K Gas Analyzer. The real-time analysis system is used to analyze hundreds of vapor samples each month.

### AMWTP Nearly Complete

Workers will soon begin retrieving waste at the Advanced Mixed Waste Treatment Project facility, though construction of the treatment facility will not be completed until later in 2002. The new facility will treat 65,000 cubic meters of the INEEL's stored transuranic and mixed waste so it can be shipped to the Waste Isolation Pilot Plant for disposal. BNFL, Inc., which holds the treatment contract, has an option to treat up to 120,000 cubic meters of additional mixed wastes.

Workers installed a 62-ton supercompactor in April 2002. It can reduce a 55-gallon drum and its contents into a "puck" about one-fifth its original size (approximately 11 gallons). Nearly 70 percent of the waste will be compacted before it is shipped.

### Waste Backlog Decreases

The INEEL met its FY 2001 goal for characterizing and disposing of mixed waste by removing 900 cubic meters for disposal off site. Cost-effective treatment subcontracts for volume reduction, mixed waste macro-encapsulation and

stabilization helped the INEEL meet its goal. Improved acceptance and disposal processes also helped the INEEL dispose of nearly 4,400 cubic meters of low-level waste in the low-level waste disposal area at the Radioactive Waste Management Complex.

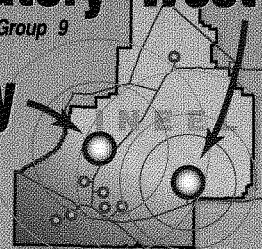


# Argonne National Laboratory–West

FFA/CO Designation: Waste Area Group 9

## Naval Reactors Facility

FFA/CO Designation: Waste Area Group 8



### Naval Reactors Facility

**Established:** 1949

**Operated by:** Bechtel Bettis Inc. for DOE's Office of Naval Reactors

**Original Mission:** Tested materials and trained operators for U.S. Navy Nuclear Propulsion Program; prepared Naval spent nuclear fuel for fissile material recovery

**Current Mission:** Inspecting, examining, researching and storing Naval spent nuclear fuel; storing special case waste

### Argonne National Laboratory–West

**Established:** 1957

**Operated by:** University of Chicago for DOE

**Original Mission:** Tested nuclear reactors and reactor safety systems

**Current Mission:** Stabilizing, managing and storing spent nuclear fuel; storing transuranic waste; developing large-scale advanced reactors

### Argonne National Laboratory–West

Argonne National Laboratory–West continued its 12-year campaign to treat 60 tons of sodium-bonded spent nuclear fuel from its Experimental Breeder Reactor–II. Current plans are to treat nearly five metric tons annually.

Argonne engineers began developing the conceptual design for a new treatment facility. The facility will be used to sort, characterize, treat and repackage stored remote-handled waste generated by DOE's hot cell

operations and analytical laboratories.

Workers continued conducting phytoremediation activities at five contaminated soil sites. They have been growing *Kochia scoparia* plants to extract cesium-137, and willows to extract chromium, mercury and selenium. Though remediation is expected to be complete in 2002, the sites will be comprehensively sampled and reviewed to ensure that the phytoremediation activities met the goals.

#### FY 2001 Highlights

- Continued electrometallurgical treatment of EBR-II sodium-bonded spent nuclear fuel (Settlement Agreement)
- Completed all Site Treatment Plan milestones for waste backlog
- Treated 750 metric tons of stored sodium mixed waste from the EBR-II and Fermi-I reactors (Site Treatment Plan)
- Continued supporting the INEEL's transuranic waste program

#### FY 2002 Goals

- Continue supporting the INEEL's transuranic waste program
- Continue electrometallurgical treatment of EBR-II sodium-bonded spent nuclear fuel

### Naval Reactors Facility

The U.S. Navy continued preparations for a dry storage facility for spent nuclear fuel. When the new facility has been built, the INEEL will transfer spent nuclear fuel that is currently in temporary storage at the Idaho Nuclear Technology and Engineering Center to the Naval Reactors Facility. The fuel will

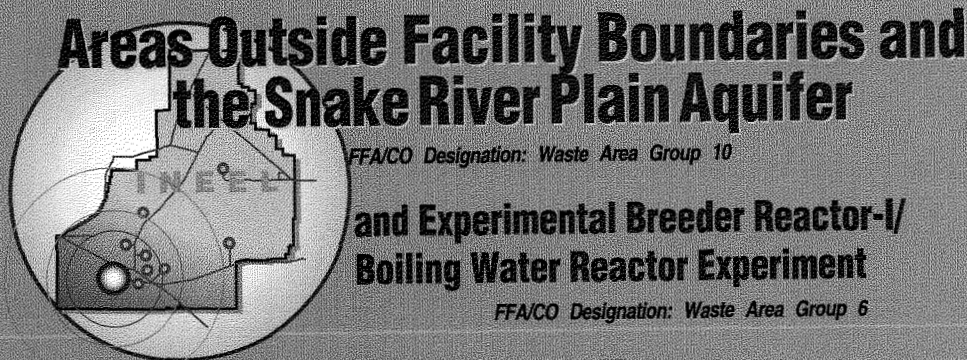
be stored at the dry storage facility until it is eventually moved to a permanent repository outside Idaho.

#### FY 2001 Highlights

- Received three shipments of Navy-owned spent nuclear fuel from U.S. Navy

#### FY 2002 Goals

- Receive four shipments of Navy-owned spent nuclear fuel from U.S. Navy
- Continue preparing for dry storage of spent nuclear fuel



# Areas Outside Facility Boundaries and the Snake River Plain Aquifer

FFA/CO Designation: Waste Area Group 10

## and Experimental Breeder Reactor-I/ Boiling Water Reactor Experiment

FFA/CO Designation: Waste Area Group 6

**Established:** 1940s

**Original Mission:** U.S. Navy proving ground and gunnery range; conducted nuclear reactor research as National Reactor Testing Station

**Current Mission:** Protecting national security interests and the public with a buffer area; site of Experimental Breeder Reactor-I National Historic Landmark, the first nuclear reactor to produce usable amounts of electricity



### Comprehensive Investigation Completed

In August 2001, the agencies completed the remedial investigation/feasibility study for the Snake River Plain Aquifer and Miscellaneous Sites including the Experimental Breeder Reactor-I/Boiling Water Reactor Experiment facilities, former reactor research facilities. The INEEL has completed remedial actions at the former research facilities.

The remedial investigation/feasibility study included surface contamination sites outside the separate facility boundaries and covered approximately 325 square miles of the INEEL's soil that is contaminated with unexploded ordnance and explosive materials remaining from past detonations. It also included a former gun range containing fragments of lead bullets.

### The Agencies' Proposals

In January 2002, the agencies issued a plan describing the surface contamination sites and the proposed cleanup options:

- **Unexploded ordnance sites**  
Detected ordnance will be

removed and institutional controls such as restricted access signs will be installed. The agencies also considered conducting no action or a limited action involving maintaining institutional controls and only removing ordnance in areas where there might be construction.

- **TNT- and RDX-contaminated soil sites**

Contaminated soil will be removed, treated and disposed of on site, institutional controls will be installed, and the TNT and RDX fragments will be detonated in a remote location at the INEEL. The agencies also considered conducting no action, incinerating or composting the contaminated soils, or disposing of the contaminated soils off site.

- **Gun range**

Metal fragments will be removed and recycled, and the lead-contaminated soil stabilized with cement and disposed of in the Central Facilities Area Landfill. The agencies also considered conducting no action, or using an acid wash process to treat

the metal fragments and contaminated soil.

The agencies are currently addressing comments from the public and should reach a final decision on the remediation later in the year.

### Coordinating Efforts to Protect the Aquifer

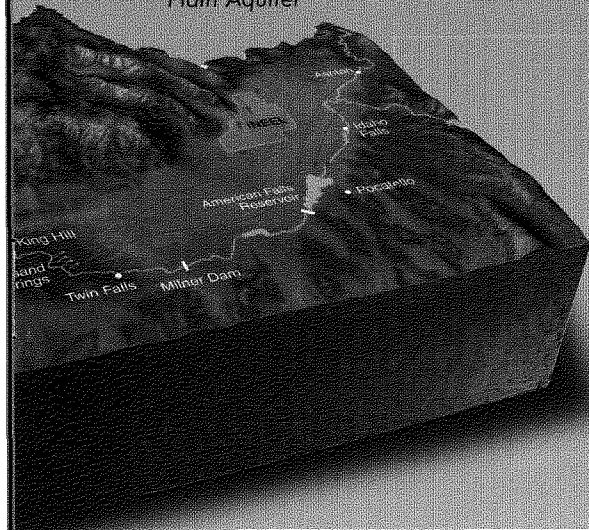
The INEEL's new Water Integration Project is coordinating the efforts to protect the Snake River Plain Aquifer. The project will help ensure that cleanup decisions made today will be effective in the future.

To find out where there are gaps in the science and data, the INEEL is identifying the various projects dealing with water issues — surface water, the vadose zone (the area between the surface and the aquifer) and the aquifer itself. A plan for filling the gaps quickly and cost-effectively will be made when the survey is complete.

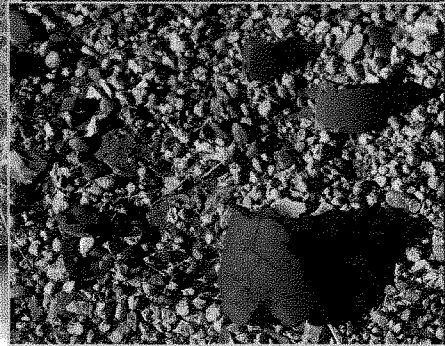
The Water Integration Project team is emphasizing independent review of water-related technical activities at the INEEL to make sure that state-of-the-art technologies are being employed. Participation is welcomed. Team meetings began in



The eastern Snake River Plain Aquifer



Old ordnance, such as bombs and shells, and explosive residues are remnants of the past



January 2002 and are held each Wednesday in Idaho Falls. Meeting minutes are posted weekly on the project's web site as are other important project documents.

The INEEL has also completed a draft public participation plan so the public and stakeholder groups can become more involved in the project.

More information on the Water Integration Project — team meetings, the minutes of past meetings and the draft public participation plan — is available on the web at [www.inel.gov/environment/water/](http://www.inel.gov/environment/water/).

The agencies are expected to make a decision on sitewide groundwater and Snake River Plain Aquifer contamination by 2005.

### **FY 2001 Highlights**

- Completed investigation of surface contamination areas (FFA/CO)
- Completed sitewide ecological risk assessment (FFA/CO)
- Issued proposed plan based on the comprehensive investigation of sitewide ecological risk, miscellaneous surface sites and the EBR-I/BORAX facilities (FFA/CO)

### **FY 2002 Goals**

- Submit draft remedial investigation/feasibility study for sitewide groundwater (FFA/CO)
- Complete Record of Decision for sitewide ecological risk, miscellaneous surface sites and the EBR-I/BORAX facilities (FFA/CO)



### **Working Safely**

The INEEL achieved Voluntary Protection Program Star status in August 2001 — the highest safety award that can be achieved by any workplace in the DOE complex. The INEEL is one of the largest employee groups in the nation to earn the VPP Star. To earn the award, worksites must exceed all Occupational Safety and Health Administration standards and continue to show improvement.